CLAIMS

1. A method of generating a reference signal, comprising steps of:

providing a spectrometer having a source that emits incident photons;

providing a ceramic element having an incident surface and an internal scattering body;

directing at least a portion of said incident photons toward said incident surface;

scattering said at least said portion of said incident photons by said ceramic; and

detecting at least a portion of said scattered photons, wherein said reference signal is generated.

2. The method of Claim 1, wherein said scattered photons result from physical interaction with at least one of:

said incident surface; and

said internal scattering body.

3. The method of Claim 2, wherein said incident surface of said ceramic diffusely reflects said incident photons.

4. The method of Claim 1, wherein said spectrometer comprises either a single beam analyzer or a dual beam analyzer.

5. The method of Claim 1, further comprising a step of:

operating said spectrometer in diffuse reflectance mode or in transflectance mode.

6. The method of Claim 1, wherein said spectrometer further comprises at least one of:

a coupling optic;

a sample interface optic, separated by a distance from said ceramic; and

a wavelength separation device.

7. The method of Claim 6, wherein said coupling optic is positioned after said ceramic element.

8. The method of Claim 6, further comprising:

a step of varying said distance between said ceramic and said interface optic in order to increase or decrease said signal.

9. The method of Claim 6, wherein said wavelength selection device comprises any of:

a prism;

a grating; and

a Michelson interferometer.

10. The method of Claim 1, wherein said reference signal comprises a reference spectrum.

11. The method of Claim 1, wherein said spectrometer comprises a noninvasive glucose analyzer.

12. The method of Claim 2, further comprising a step of:

coating said incident surface of said ceramic with a first layer contacting and completely covering said incident surface of said ceramic.

13. The method of Claim 12, wherein said first layer comprises at least one of:

a wavelength reference layer; and

a protective coating;

14. The method of Claim 13, wherein said wavelength reference layer comprises at least one of:

polystyrene;

polyethylene;

polypropylene;

epoxy;

plastic;

erbium oxide;

holmium oxide; and

dysprosium oxide.

15. The method of Claim 13, wherein said incident photons and said scattered photons are at least partially absorbed by said wavelength reference layer.

16. The method of Claim 15, further comprising a step of:

utilizing said signal to generate at least one of a transmittance value and an absorbance value.

17. The method of Claim 13, wherein said protective coating comprises any of:

sapphire;

aluminum oxide;

an optically clear epoxy; and

plastic.

18. The method of Claim 12, wherein said first layer comprises:

a first metallized coating,

wherein said first metallized coating scatters said at least a portion of said incident light, preventing said at least a portion of said incident light from penetrating into said internal scattering body of said ceramic.

19. The method of Claim 18, wherein said first metallized coating comprises at least one of:

gold;

silver;

aluminum;

platinum;

chromium;

lead; and

copper.

20. The method of Claim 18, further comprising a step of:

coating said first layer with a second layer in continual contact with and coated over entire said first layer.

21. The method of Claim 20, wherein said second layer comprises at least one of:

a standard wavelength material; and

a protective coating.

22. The method of Claim 21, wherein said standard wavelength material comprises any of:

polystyrene;

polyethylene;

polypropylene;

epoxy;

plastic;

dysprosium oxide;

erbium oxide; and

holmium oxide.

23. The method of Claim 21, further comprising a step of:

utilizing said signal to generate at least one of a transmittance value and an absorbance value.

24. The method of Claim 21, wherein said protective coating comprises any of:

sapphire;

aluminum oxide;

an optically clear epoxy; and

plastic.

25. The method of Claim 20, wherein said second layer comprises:

a second metallized coating.

26. The method of Claim 25, wherein said second metallized coating is any of:

gold;

silver;

aluminum;

platinum;

chromium;

lead; and

copper.

27. The method of Claim 25, further comprising a step of:

applying a third layer in contact with and completely covering said second layer, wherein said third layer is at least one of:

a standard wavelength material; and

a protective coating.

28. The method of Claim 27, wherein said standard wavelength material comprises any of:

polystyrene;

polyethylene;

polypropylene;

epoxy;

plastic;

dysprosium oxide;

erbium oxide; and

holmium oxide.

29. The method of Claim 28, further comprising a step of:

utilizing said signal to generate either a transmittance value or an absorbance value.

30. The method of Claim 27, wherein said protective coating comprises any of:

sapphire;

aluminum oxide;

an optically clear epoxy; and

plastic.

31. An apparatus for generating a reference signal, comprising:

a ceramic having an incident surface and a back surface;

a first layer in continual contact with and coated over at least one of either said incident surface or said back surface, wherein said first layer comprises at least one of:

a first standard wavelength material;

a first protective coating; and

a first metallized coating.

32. The apparatus of Claim 31, wherein at least one of said incident surface or said back surface is optically rough.

33. The apparatus of Claim 31, wherein said incident surface is flat.

34. The apparatus of Claim 31, wherein said first standard wavelength material comprises at least one of:

polystyrene;

polyethylene;

polypropylene;

epoxy;

plastic;

dysprosium oxide;

erbium oxide; and

holmium oxide.

35. The apparatus of Claim 31, wherein said first protective coating comprises any of:

sapphire;

aluminum oxide; and

plastic.

36. The apparatus of Claim 31, wherein said first metallized coating comprises at least one of:

gold;

silver;

aluminum;

platinum;

chromium;

lead; and

copper.

37. The apparatus of Claim 31, further comprising:

a second layer in continual contact with and coated over said first layer.

38. The apparatus of Claim 37, wherein said second layer comprises at least one of:

a secondary wavelength material;

a secondary protective coating; and

a secondary metallized coating.

39. The apparatus of Claim 38, wherein said secondary standard wavelength material comprises at least one of:

polystyrene;

polyethylene;

polypropylene;

epoxy;

plastic;

dysprosium oxide;

erbium oxide; and

holmium oxide.

40. The apparatus of Claim 38, wherein said secondary protective coating comprises any of:

sapphire;

aluminum oxide; and

plastic.

41. The apparatus of Claim 38, wherein said secondary metallized coating comprises any of:

gold;

silver;

aluminum;

platinum;

chromium;

lead; and

copper.

42. The apparatus of Claim 37, further comprising:

a third layer in continual contact with and coated over entire said second layer.

43. The apparatus of Claim 42, wherein said second layer comprises:

an outer protective coating.

44. The apparatus of Claim 43, wherein said outer protective coating comprises any of:

sapphire;

aluminum oxide; and

plastic.

45. A method of generating a reference signal, comprising steps of:

providing a spectrometer having a source that emits incident photons;

providing a ceramic material having an incident surface and a metallized back surface;

directing said incident photons through said incident surface, wherein at least a portion of said incident photons traverse said ceramic material and are diffusely reflected by said metallized back surface and subsequently emitted from said incident surface; and

detecting said emitted photons, wherein a reference signal is generated.

46. The method of Claim 45, wherein said metallized back surface of said ceramic is optically rough, such that light hitting said metallized back surface is either reflected or scattered.